Appendix 6
Affixing Radio Collars

Introduction

The purpose of this document is to provide detailed methods that would be used for fitting radio collars on wild horse mares and burro jennies. This document does not include methods for chemical immobilization, care, and maintenance of horses during gathers, while in captivity, or for any other handling procedures beyond those needed for fitting a radio collar.

The study of animal behavior and ecology requires understanding the daily life of the focal species (King, 2013). It is now common to use radio collars fitted with VHF transmitters, GPS recorders, or satellite transmitters to obtain and record data on movement and other activities. While most radio collars are considered to be minimally invasive, they can impose a cost on the animal carrying them. Thus, guidelines have been developed for a weight ratio (a collar should not exceed 5% of the animal's body weight) and best practice in their use (Ministry of Environment, Lands and Parks Resources Inventory Branch for the Terrestrial Ecosystems Task Force Resources Inventory Committee, 1998, Sikes et al., 2011). Collars have the potential to cause injury to the animal wearing them. However, when the collar is fitted correctly and monitored regularly it can provide invaluable data without any measurable impact on the study animal.

Telemetry collars have been used extensively on carnivores (Germain et al., 2008; Creel and Christianson, 2009; Hunter et al., 2010; e.g., Broekhuis et al., 2013; Cozzi et al., 2013, Dellinger et al., 2013), rodents (Chambers et al., 2000; Solomon et al., 2001; Koprowski et al., 2007), and some ungulates (Johnson et al., 2000; Creel et al., 2005; Ito et al., 2005; Allred et al., 2013, Buuveibaatar et al., 2013; Latombe et al., 2013). However, they have not been commonly used on equids. A few studies have used this tool to examine habitat use, movements, and behavior of zebra (Fischhoff et al., 2007; Sundaresan et al., 2007; Brooks and Harris, 2008) and Asiatic wild asses (Kaczensky et al., 2006, 2008, 2011). Even fewer published studies have used telemetry collars on feral horses (Committee on Wild Horse and Burro Research, 1991; Asa, 1999; Goodloe et al., 2000; Hampson et al., 2010).

Although some research has been conducted on wild horse use of vegetation and habitat (e.g. Beever and Brussard, 2000), little has been done recently, and long-term, fine-scale data on habitat use has never been gathered. Yet it is important that resource managers have a scientifically based understanding of wild equid seasonal habitat use and movements on public lands. Due to the scale of some of the Herd Management Areas (HMAs), it is logistically challenging to collect habitat use data via direct observation. Utilization of GPS and VHF collars for marking and locating individuals will provide fine-scale data about where wild horses spend their time and how they use their habitat.

From March 2015 through March 2016, researchers at the U.S. Geological Survey (USGS) conducted a year-long preliminary study on captive wild horses and burro jennies to determine proper fit and wear of radio collars (Schoenecker et al., 2014). The condition of wild horses wearing radio collars was compared to non-collared controls and documented with photographs. In addition, the behavior of both collared individuals and controls was recorded for one hour daily, in order to quantify any impact of the collar on their behavior and health. At the end of the study period (March 2016) the collars were removed (Schoenecker et al., 2020).

Radio collars consist of a 2-inch-wide strap/belt made of soft pliable plastic-like material (Figure 1). Some are oval shaped with adjustments on both sides of the collar, and others are teardrop shaped with adjustments at the top of the collar so it can be fitted to different neck sizes. This is the most optimal shape for the neck of equids. Attached to the belt of the collar is a battery pack and transmitter module. These may either be combined in the same unit or placed at the top and bottom of the collar to counterbalance each other. The size of the battery is determined by the amount of power needed, both in terms of length of deployment, and how much data will be recorded by the collar. The type of transmitter used will depend on the study, but all principles stated here for collar fitting and use apply regardless of communication systems used.

Collars can be placed on horses' necks when they are in a padded squeeze chute during a gather. It takes between 7 and 12 minutes to fit a collar on the animal. The transmitter should be functioning and turned on before the collar is fitted, then checked that it is working correctly before the animal is released.

Fitting of the collar

Fitting a collar on an equid requires an understanding of the neck circumference and shape; that is, when the head of the animal is raised the collar should be tight, and when the head is down grazing the collar will become looser (Figures 2, 3). The collar should rest just behind the ears of the equid and be tight enough so it does not slip down the neck, yet loose enough that it does not interfere with movement when the neck is flexed. The collar must fit snugly to minimize rubbing. USGS researchers used 0-1 finger spacing between collar and neck, depending on the season collar is deployed to give consideration to the potential for weight gain. Other studies (e.g., Committee on Wild Horse and Burro Research, 1991) have had problems with the fitting of collars due to animals gaining weight in spring, or losing weight in winter, causing collars to become too tight or too loose. In the USGS study, researchers did notice collars were looser or tighter at different times during the year, but it did not affect the behavior of collared mares or jennies, or cause sores or wounds on mares or jennies. Whenever collars are deployed, they should be fitted by experienced personnel who can attach the collar quickly but proficiently to minimize handling stress on the animal.

Impacts of the Use of Radio Collars or Tail Tags

Based on numerous studies that have used modern radio collars with remote releases and tags to study the ecology of wild ungulates and equids in particular, these devices have minimal effects on the animals wearing them. The impact of radio collars and tags is very minimal. From March 2015 through March 2016 researchers at the USGS conducted a preliminary study on captive wild horses and burro jennies to determine proper fit and wear of radio collars (Schoenecker et al., 2014).

The condition of wild horses wearing radio collars was compared to non-collared controls and documented with photographs. In addition, both collared individuals and controls were observed for 80 minutes each week for 14 weeks in order to quantify any impact of the collar on their behavior and health. At the end of the study period (March 2016) the collars were removed. Preliminary analyses indicate that mares had almost no impact in terms of rubbing or wear from radio collars and behavior of collared and uncollared mares did not differ (Schoenecker et al., 2020). There was also no impact of radio tags on behavior or wear. Preliminary data on a study completed in 2020 confirms these finding. If new data becomes available from the most recent studies, the procedures for use of collars and tail tags will be updated accordingly.

There are some possible effects from the use of collars on horses. On males, on rare occasions, a collar over an ear has been observed, so no males would be collared. Also, collars may be fitted too tightly, or a horse may grow, tightening the collar. If these situations are observed, the remote-release function would be deployed remotely. If the remote release failed, the collar would be removed after capturing the animal through approved methods in the proposed action. Neck abrasions or sores have not been reported in studies where equids have been collared (e.g., Collins et al., 2014). If neck abrasions or sores caused by a collar are observed and have not healed within 4 weeks of when it is observed, the collar's remote release would be deployed or the horse would be captured as soon as possible to remove the collar.

No effects are expected from the tags; however, it is possible that they may form an irritation to individuals should vegetation get tangled in the tail. In this case it is expected that the tag would ultimately rip out of the hair (leaving no injury) as the horse rubs it.

The use of collar and tag technology is critical to understanding how free-roaming horses move across the HMAs and use increasingly scarce resources. Lack of this information has contributed to the management complexity of this species. Applying this technology to the study of free-roaming horses would provide the opportunity to better understand horse resource use, habitat preference, home range and movement patterns and can be incorporated into investigations of social structure and herd or band dynamics as well as behavioral modifications associated with reproductive management including contraceptive use and sterilization. Such information can be used for future management decisions within the HMAs.

Figure 1. Two collar designs to use on wild horses and burros; one is teardrop shaped, and the other is oval shaped from Collins et al. (2014).

Figure 2. Burro jenny fitted with a radio collar in the USGS study showing appropriate placement of collars higher on the neck, behind ears.

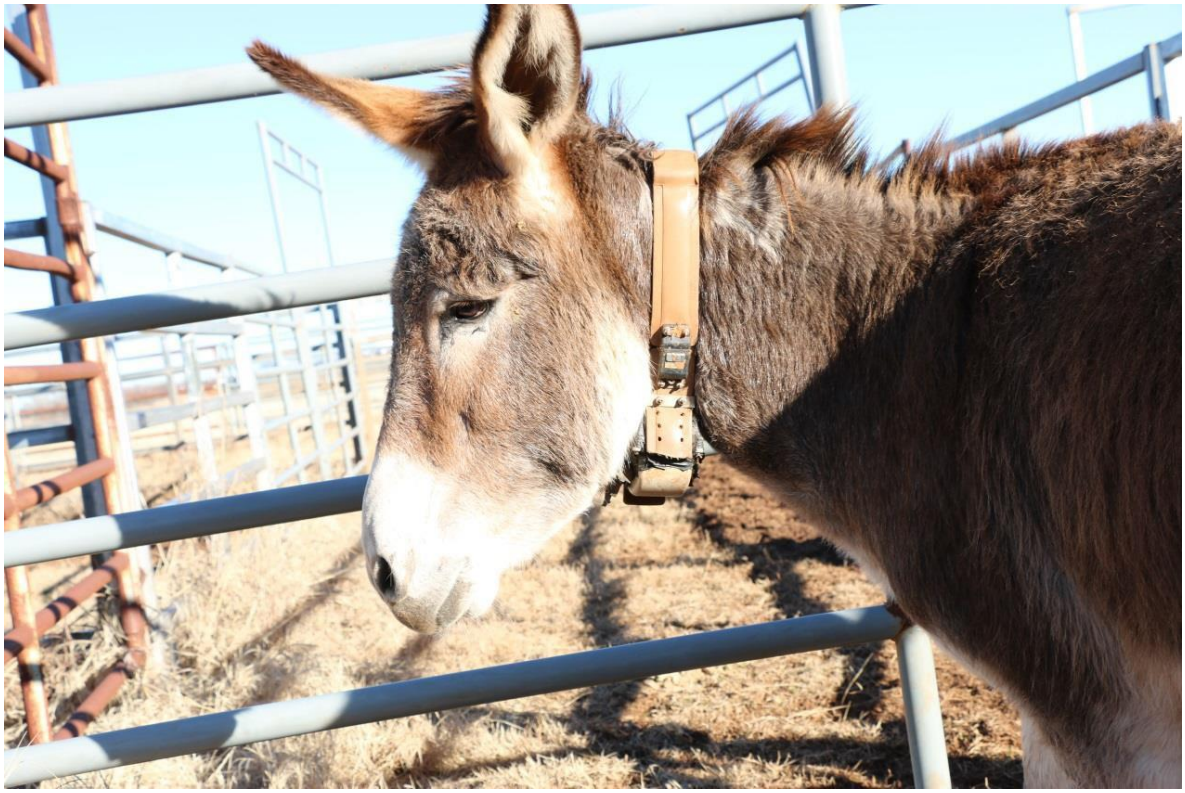

Figure 3. Wild horse mares fitted with radio collars in the USGS study showing head up and head down and demonstrating appropriate placement of collars higher on the neck just behind the ears.








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